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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
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09/960,659

09/21/2001

Pradeep K. Agarwal

W002.PAT-12

5569

7590

02/17/2004

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EXAMINER

MAYEKAR, KISHOR

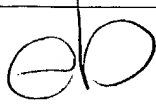
ART UNIT

PAPER NUMBER

1753

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                               |   |  |
|------------------------------|-------------------------------|---|--|
| <b>Office Action Summary</b> | Application No.<br>09/960,659 | Applicant(s)<br>AGARWAL ET AL.  |  |
|                              | Examiner<br>Kishor Mayekar    | Art Unit<br>1753  |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 24-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 24-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

1. Applicant's arguments with respect to claims 24-37 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 24-37 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support for the recited subject matter of "converting H<sub>2</sub>S in a natural gas stream to elemental sulfur and hydrogen in a single operation" as now claimed in claims 24-29

and 30-36. Also there is no support for the recited subject matter of "a tubular pulsed corona ... having sulfur resistant inner walls supported on a stainless steel substrate, and further having a sulfur resistant wire electrode" as claimed in new claims 33-36, and the recited subject matter of " a wire-in-tube pulsed ... having sulfur-resistant inner walls ... on a stainless steel ... metal layer and the wire electrode ... platinum and copper wherein the preferred alloy consists of 95% Pt and 5% Cu as claimed in new claim 37.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 37 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 37, the phrase "contacting the hydrogen sulfide ... with a solid adsorbent ... in the presence of an attrition-resistant lubricant and a means for recovery of the adsorbed hydrogen sulfide" is confusing and vague.

*Claim Rejections - 35 USC § 103*

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 24, 25 and 30-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admission in view of HAAS et al. (3,933,608) and CONRAD (5,130,003), both references cited in the last office action. Applicant admits in the section "Description of the Prior Art" in pages 2-3 of the specification that natural gas contains significant amounts of  $H_2S$ ,  $CO_2$  and  $H_2O$  and other sulfur-containing contaminants and the commerce use of the natural gas calls for the removal of the above contaminants from the natural gas stream. Applicant also admits that the conversion of  $H_2S$  to elemental sulfur can be achieved by a non-thermal plasma process, including corona and dielectric barrier discharge. The difference between the admission and the above claims is the combination of the known devices for converting  $H_2S$  in a natural gas stream to elemental sulfur and hydrogen. HAAS in a method for the decomposing of hydrogen sulfide to elemental sulfur and hydrogen by exposing a gas containing the

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hydrogen sulfide to a silent electrical discharge discloses in col. 1, line 59 through col. 2, line 21 the use of the silent electrical discharge, as use in ozonizer, as a conversion means for receiving the hydrogen sulfide containing gas and for converting the hydrogen sulfide to elemental sulfur and hydrogen. HAAS further discloses in col. 2, lines 58-66 that the hydrogen-sulfide containing gas is a gas resulted from an industrial process either as the principal hydrogen sulfide abating process or a secondary removal operation and in paragraph crossing cols. 2 and 3 that the conversion is at  $-40^{\circ}\text{C}$  up to  $61^{\circ}\text{C}$ . And CONRAD discloses in an ozonizer in col. 1, lines 13-34 that the silent discharge is also known as corona discharge. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the admission as suggested by HAAS and CONRAD because the selection and the combination of such devices for converting  $\text{H}_2\text{S}$  in a natural gas stream to elemental sulfur and hydrogen would be within the level of ordinary skill in the art.

8. Claims 26-29 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admission as modified by HAAS and CONRAD as applied to claims 24, 25 and 30-36 above, and further in view of CA 675292 A and

Applicant's admission. The difference between the references as applied above and the instant claims is the recited provision of structures in claim 27. CA '292, a reference cited by Applicant, shows in a method of separating moisture and hydrogen sulfide from natural gas streams the provision of adsorbent means comprising a first adsorbent having a first predetermined temperature and a second adsorbent having a second temperature greater than the first predetermined temperature (paragraph crossing pages 11 and 12). Applicant admits in paragraph crossing pages 1 and 2 the use of fixed beds and fluidized beds are known and in the last paragraph of page 2 it is known that the fluidized bed adsorption process is better than the fixed bed adsorption process in the removal of  $H_2S$ . The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references' teachings as suggested by CA '292 and again Applicant's admission because the selection of any of known equivalent adsorption means for the removal of  $H_2S$  would be within the level of ordinary skill in the art.

As to the selection of material resistant to sulfur, this would be within the level of ordinary skill in the art.

*Response to Arguments*

9. Applicant's arguments filed 11/13/2003 have been fully considered but they are not persuasive because the new grounds of rejection as set forth in the paragraph above.

*Conclusion*

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be



calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

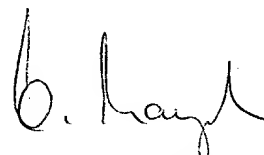
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kishor Mayekar whose telephone number is (571) 272-1339. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'K. Mayekar', written in a cursive style.

Kishor Mayekar  
Primary Examiner  
Art Unit 1753